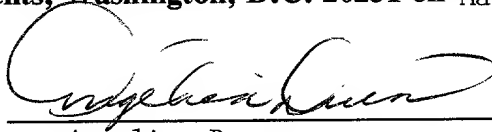


CERTIFICATE OF MAILING

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Angelica Duran

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

INVENTOR(S): W. Wistar Rhoads, et al DOCKET: 10961133-6

PATENT NO.: 5,905,514 GROUP: 7707

ISSUED: May 18, 1999 EXAMINER:

TITLE: SERVICING SYSTEM FOR AN INKJET PRINTHEAD

REISSUE PRELIMINARY AMENDMENT

Attached is a copy of the printed patent, in double column format, each page on only one side of a single sheet of paper. Also enclosed is a complete set of drawings of the printed patent on A4 size paper. The following amendments are respectfully requested:

IN THE SPECIFICATION:

Insert the following in Col. 5, after line 36:

Fig. 7B is a sectional elevation view of a portion of the pen shown in Fig.

7 illustrating a further alternate embodiment of the invention.

Replace the paragraph from Col. 12, line 39 through Col. 12, line 48 with the following:

Among the possible ways to implement this embodiment of the present invention a design found to work well involves incorporating a porous open cell rigid foam block 108 in the treatment fluid reservoir 100 incorporated in the pen 20. This foam block completely fills the reservoir and is impregnated with treatment fluid. In a further embodiment [(not shown)] shown in Fig. 7B the wick 102 is eliminated and an exposed portion of this foam is positioned to intercept the wiper 70 in relative wiping movement.

Replace the paragraph from Col. 16, line 19 through line 31 with the following:

The duckbill applicator 132 acts as a checkvalve in operation of the pump. A further checkvalve 142 is required for pumping, as is well known, and is placed in a conduit 152 supplying treatment fluid from a collapsible fluid reservoir 144 for example. A low volume spray pump [(not shown)] of the type seen in Fig. 36 of conventional configuration could be substituted, such a spray pump having its nozzle projecting upward so as to spray the orifice plate 40 upon the pen being capped.

IN THE CLAIMS:

1. (Amended) A [wet wiping] system for servicing a printhead having an orifice plate, comprising:
a [moveable] container having a reservoir [of] for treatment fluid disposed therein;

a first block of porous material disposed within said container for absorbing treatment fluid by capillary action [said reservoir of treatment fluid];

[another] a second block of porous material partially disposed within said container and extending outwardly therefrom a sufficient distance to facilitate transfer of treatment fluid to the orifice plate when said container and printhead move relative to one another;

said [another] second block of porous material having substantially greater capillary action than said first block of porous material so that a distal end portion of [the another] said second block [is] may be continuously supplied with treatment fluid from said reservoir for facilitating the transfer of treatment fluid to the orifice plate; and

a wiper mounted adjacent said moveable container for engaging the orifice plate when said moveable container and printhead move relative to one another;

said [movable] container and printhead moving a sufficient distance relative to one another in at least one [relative axes] direction so that a sufficient amount of the treatment fluid from said distal end portion [of a transfer element is] may be transferred to the orifice plate for transporting dried printhead residue therefrom as said wiper engagingly travels across the orifice plate; and

wherein said first block of porous material [is a block of open cell foam that] substantially fills said container.

2. (Amended) A wet wiping system according to claim 1, wherein said [another] distal end portion of said second block of porous material [includes an applicator, said applicator

having a first portion in fluid communication with said reservoir to draw fluid from said reservoir, and said applicator having a tip configured and positioned for directly contacting at least one of said elements to apply a reproducible quantity of servicing fluid onto said at least one element, servicing fluid being transferred to the tip of the applicator by capillary action and said applicator being] is located adjacent to said cap.

3. (Amended) The system of claim 2, wherein said [applicator] distal end portion contacts said printhead when said printhead is capped.

4. (Amended) The system of claim 3, wherein said printer further comprises a reciprocally moveable carriage for carrying the printhead, said carriage being moveable between a first limit and a second limit of travel along a guide rod,

wherein said [applicator] container is mounted for movement on said guide rod to apply treatment fluid to said wiper as said [applicator] container is moved along said rod by contact with said carriage.

5. The system of claim 3, wherein said [applicator] distal end portion is located within said cap.

Cancel claim 6.

7. (Amended) The system of claim [6] 4, further comprising:

a biasing [spring] member for biasing said [applicator] container to a certain position adjacent a certain side of said wiper.

8. (Amended) The system of claim 2, wherein said [applicator] wiper further comprises a first wiper having an applicator portion.

9. (Amended) The system of claim 8, wherein said first wiper is flexed by contact with said printhead to move said applicator portion into engagement with said [applicator] distal end portion of said second block of porous material.

10. (Amended) The system of claim 9, further comprising a second wiper adjacent said [applicator] distal end portion on a side opposite said first wiper, whereby said [printhead is] orifice plate may be wiped by said second wiper prior to application of servicing fluid to said [printhead] orifice plate by said applicator portion of said first wiper.

11. (Amended) [A wet wiping] The system [according to] of claim 1, wherein said first block [of open cell foam] is elastomeric open cell foam.

12. (Amended) [A wet wiping] The system [according to] of claim 1, wherein said container includes a small vent hole for allowing air to enter said container as fluid is withdrawn therefrom by capillary action.

13. (Amended) [A wet wiping] The system [according to] of claim [1] 10, wherein said [another] second block of porous material is disposed in a space between said wiper and said transfer [element] portion.

14. (Amended) [A wet wiping] The system [according to] of claim 13, wherein said transfer [element] portion squeezes said [another] second block of porous material when moved

laterally by said printhead with a sufficient amount of force to cause said sufficient amount of treatment fluid to expel upwardly from said distal end portion onto said first wiper for subsequent engagement with said orifice plate as said printhead moves along a given path of travel into wiping engagement with said wiper.

15. (Amended) [A wet wiping] The system [according to] of claim 14, wherein said transfer [element] portion is [an] elastomeric [transfer element].

16. (Amended) A system for servicing a portion of a printhead of an inkjet [printer] printing mechanism having a printhead reciprocally moved by a carriage, a cap for capping said printhead and a wiper [positioned to move with respect to the] for wiping said printhead [in wiping contact therewith to remove unwanted accumulations when the printhead and the wiper are moved with respect to each other by movement of at least one of two elements consisting of the printhead and the wiper] during relative movement of said printhead and said wiper, said system comprising:

a source of printhead servicing fluid including a fluid reservoir; and

an applicator [at least partially formed of a wicking material having a first portion] in fluid communication with said reservoir to draw fluid from said reservoir, and said applicator having a tip configured and positioned for directly contacting [at least one of said elements] said wiper to apply a reproducible quantity of servicing fluid onto said [at least one element] wiper, servicing fluid being transferred to the tip of the applicator by capillary action [and said applicator being

located adjacent to said cap];

wherein said printer further comprises:

a reciprocally movable carriage which moves between a first limit and a second limit of travel along a guide rod, and a printhead carried by said carriage wherein said applicator is carried by said guide rod so as to move with a printer carriage to wipingly contact said wiper element;

wherein said source of servicing fluid is stationary and is mounted adjacent a path of travel of said printhead carriage; [and]

a pump for pumping servicing fluid from said source to said applicator; and

wherein the pump is actuated by movement of said carriage, said applicator being dosed by moving the carriage to a position to actuate said pump and in a coordinated manner moving the applicator to a position where said applicator receives said treatment fluid pumped from said stationary source of servicing fluid.

17. The system of claim 16, wherein said pump is located at a limit of reciprocal movement of the carriage and further comprising a spigot in fluid communication with said pump, said spigot located so as to dispense servicing fluid to said applicator when said actuator is positioned at said limit of reciprocal movement.

18. A system for servicing a printhead of an inkjet printer, comprising:

a composite wiper element having first and second impervious elastomeric layers, and a layer of porous elastomeric foam sandwiched therebetween;

a quantity of treatment fluid disposed in said layer of porous elastomeric foam and in fluid communication with a normally open opening adjacent a top portion of said composite wiper element and allowing servicing fluid to flow out to assist in wiping said printhead by wipingly contacting the composite wiper and said printhead.

19. The system of claim 18, wherein said composite wiper is deformed resiliently by contact with said printhead to expel fluid from said opening.

20. A system for servicing a printhead element of an inkjet printer wherein two elements, consisting of said printhead and a wiper element moveable with respect to the printhead in wiping contact therewith, are moved with respect to one another to remove unwanted accumulations from a portion of the printhead comprising:

a composite wiper element having first and second impervious elastomeric layers, and a layer of fluid impregnated porous elastomeric foam sandwiched therebetween, said foam layer containing a quantity of servicing fluid therein and being in fluid communication with a normally open opening adjacent a top portion of said composite wiper element and allowing servicing fluid to flow out to assist in wiping said printhead by wipingly contacting the composite wiper and said printhead;

wherein said composite wiper is resiliently deformed by contact with said printhead to expel fluid from said opening; and

a separate source of servicing fluid in fluid communication with said porous layer to

replenish the servicing fluid contained in the porous layer.

21. The system of claim 20, wherein fluid is transferred to said composite wiper from said separate source by a pumping action of said composite wiper upon rebound from deformation due to wiping the printhead.

22. The system of claim 21, wherein said first and second elastomeric impervious layers are of unequal height, at least one of said layers having a tapered top which is engaged by said printhead to bend said one layer to close said opening.

23. The system of claim 21, further comprising an opening adjacent a top edge of said wiper on a side first contacted by said printhead in wiping.

24. (Amended) A [wet wiping] system for servicing a printhead [having an orifice plate], comprising:

a [moveable] container having a reservoir of treatment fluid disposed therein;

a first block of porous material disposed within said container for absorbing by capillary action said reservoir of treatment fluid;

[another] a second block of porous material partially disposed within said container and extending outwardly therefrom a sufficient distance to facilitate transfer of treatment fluid to the [orifice plate] printhead when said container and printhead move relative to one another.

said [another] second block of porous material having substantially greater capillary action than said first block of porous material so that a distal end portion of [the another] said second

block is continuously supplied with treatment fluid from said reservoir for facilitating the transfer of treatment fluid to [the orifice plate] said printhead;

and

a wiper mounted adjacent said moveable container for engaging [the orifice plate] said printhead when said moveable container and printhead move relative to one another;

said moveable container and printhead moving a sufficient distance relative to one another in at least one [relative axes] direction so that a sufficient amount of the treatment fluid from said distal end portion [of the transfer element] is transferred to [the orifice plate] said printhead for transporting dried printhead residue therefrom as said wiper engagingly travels across the orifice plate for printhead cleaning purposes.

25. (Amended) A [wet wiping] system for servicing a printhead [having an orifice plate], comprising:

a moveable container having a reservoir of treatment fluid disposed therein;

a first block of porous material disposed within said container for absorbing by capillary action said reservoir of treatment fluid;

[another] second block of porous material partially disposed within said container and extending outwardly therefrom a sufficient distance to facilitate transfer of treatment fluid to [the orifice plate] said printhead when said container and printhead move relative to one another;

said [another] second block of porous material having substantially greater capillary action

than said first block of porous material so that a distal end portion of [the another] said second block is continuously supplied with treatment fluid from said reservoir for facilitating the transfer of treatment fluid to [the orifice plate] said printhead; and

a wiper mounted adjacent said moveable container for engaging [the orifice plate] said printhead when said moveable container and printhead move relative to one another;

said moveable container and printhead moving a sufficient distance relative to one another in at least one [relative axes] direction so that a sufficient amount of the treatment fluid from said distal end portion [of a transfer element] is transferred to [the orifice plate] said printhead for transporting dried printhead residue therefrom as said wiper engagingly travels across [the orifice plate] said printhead; and

wherein said [another] second block engages [the orifice plate] said printhead when said container and printhead are moved [relative] toward one another in a vertical direction [only].

26. (Amended) A wet wiping system for a printhead [having an orifice plate], comprising:

a moveable container having a reservoir of treatment fluid disposed therein;

a block of porous material disposed within said container for absorbing by capillary action said reservoir of treatment fluid;

another block of porous material partially disposed within said container and extending outwardly therefrom a sufficient distance to facilitate transfer of treatment fluid to [the orifice

plate] said printhead when said container and printhead move relative to one another;

said another block of porous material having substantially greater capillary action than said block of porous material so that a distal end portion of the another block is continuously supplied with treatment fluid from said reservoir for facilitating the transfer of treatment fluid to [the orifice plate] said printhead; and

a wiper mounted adjacent said moveable container for engaging [the orifice plate] said printhead when said moveable container and printhead move relative to one another;

said movable container and printhead moving a sufficient distance relative to one another in at least one [relative axes] direction so that a sufficient amount of the treatment fluid from said distal end portion of a transfer element is transferred to [the orifice plate] said printhead for transporting dried printhead residue therefrom as said wiper engagingly travels across [the orifice plate] said printhead; and

further comprising a transfer element mounted at about said moveable container and spaced from said wiper for further facilitating the transfer of said sufficient amount of treatment fluid to [the orifice plate of the] said printhead.

Add the following new claims:

27. (New) A system for servicing a printhead of an inkjet printing mechanism, comprising:

a service station including a cap which covers the printhead when positioned at said

service station and a wiper which wipes said printhead during relative movement of said printhead and said wiper;

a source of printhead servicing fluid; and

an applicator pump having a fluid outlet in said cap for wetting said printhead with a predetermined quantity of said fluid.

28. (New) The system of claim 27, wherein said pump is actuated by movement of said service station relative to said printhead.

29. (New) The system of claim 28, wherein said pump includes a piston moved by contact of said cap with said printhead.

30. (New) The system of claim 29, wherein said outlet is a duckbill valve.

31. (New) The system of claim 27, wherein said pump is a low volume spray pump.

32. (New) An inkjet printhead cartridge comprising a container of ink, an area having orifices through which ink is ejected from said container during printing, a reservoir of printhead servicing fluid matched for use with said ink and an applicator for applying a reproducible quantity of said servicing fluid onto a printhead wiper which wipes said orifices during relative movement of said printhead and wiper.

33. (New) The cartridge of claim 32, wherein said servicing fluid is impregnated in a porous material filling said reservoir.

34. (New) The cartridge of claim 33 wherein said applicator comprises a wick in fluid communication with said porous material, said wick having a fluid dispensing surface positioned for applying said fluid to a wiper which subsequently wipes said orifices.

35. (New) The cartridge of claim 34, wherein said wick has substantially greater capillary attraction force than said porous material.

36. (New) The cartridge of claim 35, wherein said porous material is an open cell rigid foam block.

37. (New) The cartridge of claim 34, wherein said cartridge is refillable.

38. (New) The cartridge of claim 34, wherein said cartridge is disposable.

39. (New) An inkjet printing mechanism in combination with the servicing system of claim 1.

40. (New) An inkjet printing mechanism in combination with the servicing system of claim 16.

41. (New) An inkjet printing mechanism in combination with the servicing system of claim 18.

42. (New) An inkjet printing mechanism in combination with the servicing system of claim 20.

43. (New) An inkjet printing mechanism in combination with the servicing system of claim 24.

44. (New) An inkjet printing mechanism in combination with the servicing system of claim 25.

45. (New) An inkjet printing mechanism in combination with the wet wiping system of claim 26.

46. (New) A method of servicing an inkjet printhead comprising applying a reproducible quantity of servicing fluid to said printhead by causing mutual movement of said printhead and a resilient fluid applicator and wiping said printhead to remove said fluid from said printhead.

47. (New) The method of claim 46, comprising moving said printhead to engage said applicator.

48. (New) The method of claim 47, comprising engaging a flexible applicator by contact with said printhead to release said fluid onto said printhead.

49. (New) The method of claim 47, comprising moving a flexible applicator by contact with said printhead to cause said applicator to apply said fluid onto a wiper and moving said printhead with respect to said wiper to wipe said printhead.

50. (New) The method of claim 46, wherein said applicator comprises a resilient wiper and movement of said printhead actuates a pump for applying fluid onto said wiper.

51. (New) The system of claim 4, wherein said biasing member is a coil spring.

IN THE DRAWINGS:

Attached is a new Fig. 7B to be added to the application. Also attached is a print of Fig. 14 adding a leader line to reference numeral 142.

REMARKS

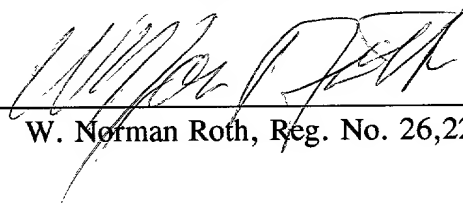
The status of all claims as of the date of this amendment and an explanation of the support in the disclosure of the patent for the changes made to the claims is attached. All claims including those which are not amended have been reproduced above for convenience in reading.

New Fig. 7B is added to illustrate the embodiment discussed at Col. 12, line 46 in which the wick 102 has been eliminated an exposed portion of the foam 108 is positioned to intercept the wiper 70. No new matter has been added.

Respectfully submitted,

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by



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STATEMENT OF STATUS OF CLAIMS AND EXPLANATION OF SUPPORT FOR CLAIM
CHANGES - PAT. 5,905,514

As of the date of the attached amendment all of pending claims 1 - 26 presently appear in the patent. The claims have been amended for clarification of the language of the issued patent claims and support for the changes is generally found in the original unamended text of the claims themselves. Since the container of treatment fluid must move only relative to the printhead, claim 1 has been broadened by eliminating reference to a moveable container. Since the first block of porous material need not be open cell foam (see Col. 10, line 60 ("an open-cell foam for example may be used...") and Col. 11, line 23 ("such as rigid or elastomeric open-cell foam..."))).

Independent claim 16 has been amended to more clearly read onto the embodiment illustrated in Fig. 11 where the applicator need not be at least partially formed of a wicking material (in the preferred embodiment of Fig. 11 it is a duckbill valve) and where it is not necessarily located adjacent to the cap.

The new claims have been added since the original patent is believed partly inoperative by reason of the patentee claiming less than he had the right to claim in the patent.

Claim 46 -48 are directed to methods which may be performed by the embodiments shown in Figs. 2-10.

Claim 49 is directed to a method as shown for example in Fig. 8.

Claim 50 is directed to a method as shown for example in Fig. 11.

α	β	γ	δ	ϵ	ζ	η	θ	ι	κ	λ	μ	ν	ξ	\omicron	π	ρ	σ	τ	υ	ϕ	χ	ψ	ω
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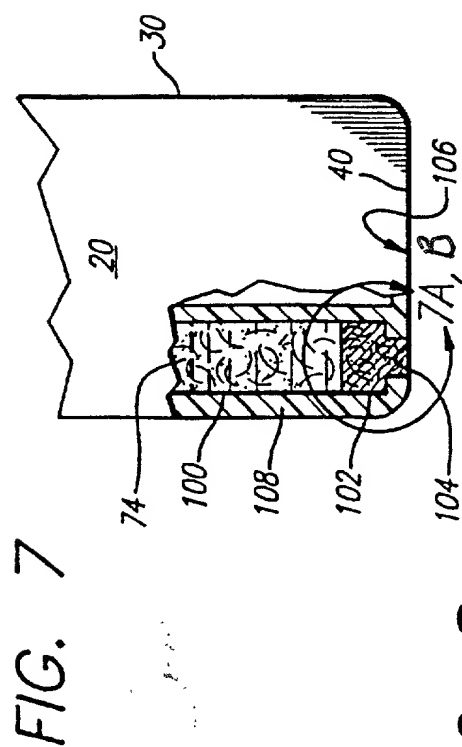


FIG. 7

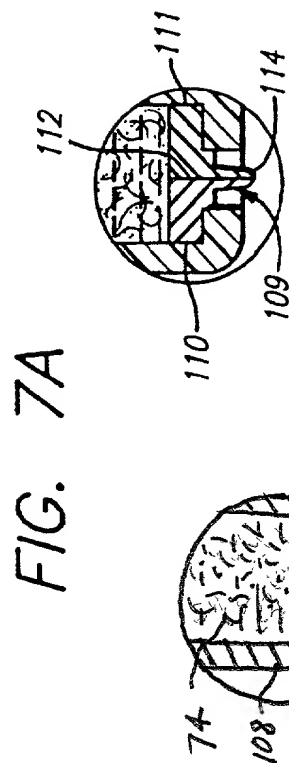


FIG. 7A

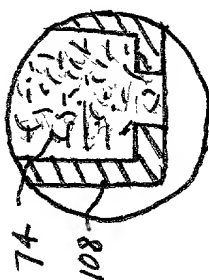


FIG. 8

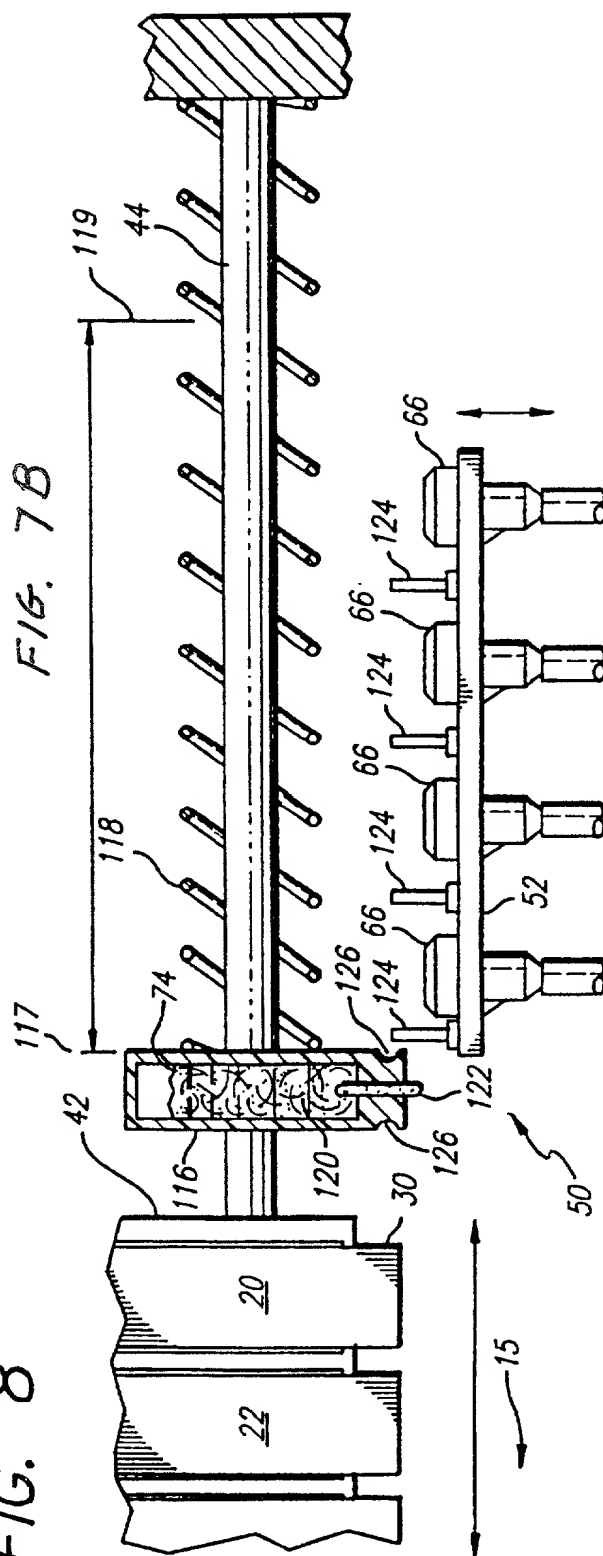


Fig. 7B

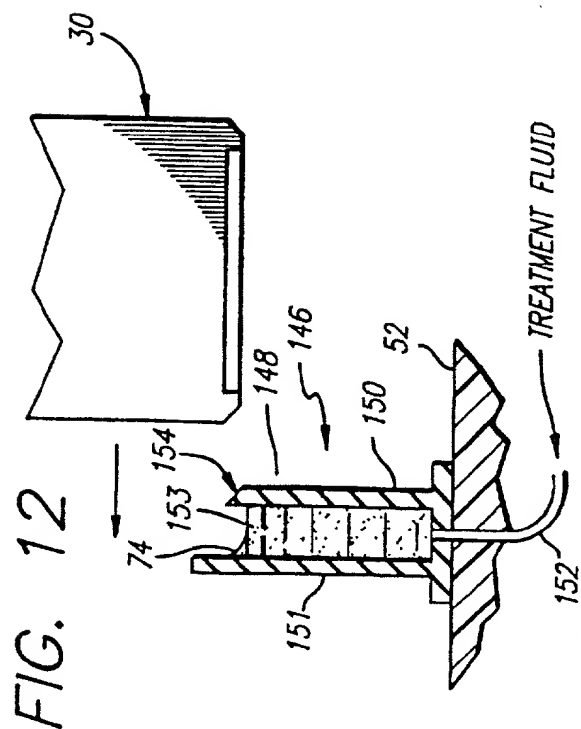


FIG. 13

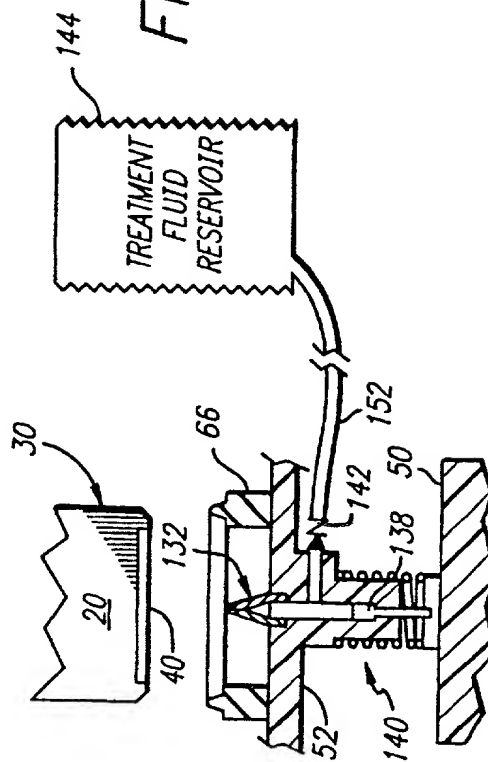
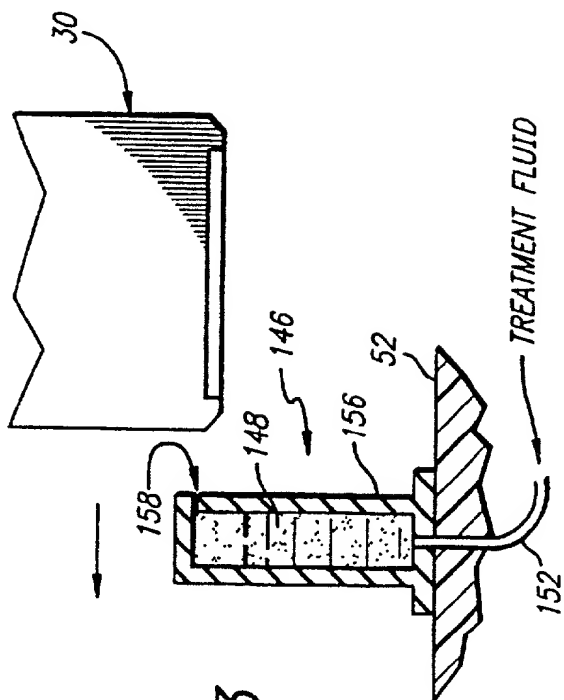


FIG. 12